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BUILDING-STONES OF EAST TEXAS.

IT is generally supposed that building-stones are very rare in eastern Texas, and that nothing harder than a clay or sand bed is to be found. This is far from true, according to R. A. Penrose, jun., in the *Texas Geological and Scientific Bulletin* for March, as there are found in many of the eastern counties rocks which combine variety and beauty with strength and durability. The sandstones are the most important; the limestones, though equally serviceable, being less widely distributed.

The State Penitentiary, at Rusk, is built of a yellow sandstone composed of grains of silicious sand and altered greensand. It is of a yellow color, easily cut, and occurs near the penitentiary in a bed about twelve feet thick. This Claiborne greensand itself is also used extensively for building chimneys and foundations, and in many cases it might be used for more extensive structures. It is found in many places in the form of a yellow indurated mass, the color being due to the alteration of the greensand. It is also found of a green color and a compact clayey consistency. Both these varieties are found in many places of sufficient strength to prove of considerable value in building, though they are generally soft and crumbly.

Near Alto, in Cherokee County, and elsewhere, is found a white sandstone, very tough, hard, compact, and durable. It is in some places slightly colored by oxide of iron, but in others is of a pure snow-white. It occurs in a bed capping the Claiborne marls, and varies from one to three feet in thickness. This would prove a most serviceable rock for building-purposes; and where it preserves its white color, without blotches from iron, it is by far the most beautiful rock in eastern Texas. It has as yet been but little used, but, with the rapid start in the development of its resources that eastern Texas is taking, it is bound to find the place it deserves among the stones of the State. A variety of it from five miles west of Jacksonville is said to have been used with great success for mill-stones. It is also found in other places.

Brown sandstones of variable composition and hardness are found in many places, and are the most generally distributed, and consequently most important of the East Texas building-stones. They occur in many localities, and vary from a light brown, soft and easily cut rock, to a hard flinty variety of a dark-brown color. The beds are from one to over fifteen feet thick, lie horizontally, and are usually found capping knolls or hills. They are sometimes the result of induration by the agency of oxide of iron, of quaternary sands, and at others the result of a similar change in eocene sands. The source of the iron solutions which caused this cementing action has been the oxidation of pyrites in the bed, or of ferruginous solutions percolating through the bed and derived from the decomposed pyrites in associated beds, such as pyritiferous lignites, greensands, and clays.

The limestone of Scott's quarry, in Smith County, is a hard, tough, compact gray rock, excellently adapted for building-purposes, and of great durability.

TEXAS ASPHALTUM.

THE absolute need of material suited for serviceable pavements is well known and fully appreciated all over the State of Texas. In some of the principal cities there have been considerable bodies of pavements laid with asphaltum brought from Trinidad, by mixing it with a certain amount of calcareous matter, and heating it to such a point that it would harden on cooling. This is done to imitate the natural mixture of limestone and bitumen found in the deposit of Val-de-Travers, of which the best French pavements are made. Dr. Ure, speaking of these two materials, says: "Bitumen alone is not so well adapted for making a substantial mastic as the native compound of bitumen and calcareous earth, which has been properly called asphaltic rock, of which the richest and most extensive mine is that of Val-de-Travers. The calcareous matter is so intimately combined and penetrated with the bitumen as to resist the action of air and water for any length of time. It would indeed be a difficult matter to combine, by artificial methods, calcareous earth thus intimately with bitumen; and for this reason the

mastics made in this way are found to be much more perishable." In these deductions he is fully borne out by the experience of those using the two materials throughout Europe, and even in this country.

Among the specimens collected by Col. J. L. Tait, on his trip to South-west Texas last November, was a small piece of a dark-blue limestone thoroughly impregnated with bitumen. The rains were so continuous, however, that no detailed examination could be made, but later it was found that the quantity is equal to all demands; and a somewhat larger specimen was obtained and subjected to analysis, with the result of proving it almost identical in composition with that of the Val-de-Travers, as will be seen by the following:—Val-de-Travers: bitumen, 20 per cent; limestone, 80 per cent. Uvalde County: bitumen, 20.35 per cent; limestone, 79.65 per cent.

This, E. T. Dumble, in a communication to the *Texas Geological and Scientific Bulletin*, thinks will prove to be of great and lasting benefit to the State. In addition to this, many deposits of bituminous sands or shales occur which yield ten per cent, and sometimes a larger amount, of bitumen.

EXPLORATION IN MEXICO.

In the winter of 1887-88, Dr. Ed. Seler undertook a journey to Mexico to pursue archaeological researches. A preliminary report of his expedition is given in the "Proceedings of the Royal Geographical Society," from which we learn that he devoted himself principally to researches in the country of the Huaxteca and Zapoteca. The important result of his journey is the demonstration of the fact that the apparent and supposed fundamental difference between the Aztec hieroglyphics and the Maya manuscripts does not exist. Dr. Seler, starting from the capital, first visited the Huaxteca Indians. Their territory is an extensive forest country. The fertile mountain slopes and river lowlands are everywhere clothed with luxuriant tropical forest, in which fig-trees, and, as underwood, bamboos, are conspicuous. The open valleys and the high ridges which extend between the river-courses are covered with either thin or thick forests of fan-palms. In the clearings, tall, many-colored grasses and mimosa-bushes cover the ground.

The principal villages are situated along the river-courses and upon the plateaus between the rivers. Numerous small ranches are scattered through the woods. The inhabitants are principally engaged in cattle-raising; horses, oxen, and mules living out in the forest, and being driven into the corrals only once a year. The capital draws its chief supply of meat from this province, the cattle being driven to Pachura, whence they are conveyed by rail to the city. Agriculture is carried on only to a very limited extent; and it is a significant fact that this country, which might supply half of the whole republic of Mexico with corn, imports this very article from the United States. There are no irrigation-works, by means of which the destructive effects of droughts might easily be obviated. The Indians grow corn, black beans, and pepper, and make brown sugar and smoked bananas. They manufacture mats from palm-leaves and agave fibre. Candles are made from the plentiful supply of tallow obtained from the cattle. The principal imports are coarse calicoes, ribbons, beads, cheap articles of finery, harnesses, hardware, liquor, and petroleum. There are only very few people who can read and write. Their amusements consist in fandango-like dances, cock-fighting, and horse-racing.

The roads are mere trails cut through the forests, which, in bottom-lands and at river-crossings, are often exceedingly difficult, and impassable to all but native horses. The customary house in the country is the *jacal*, or thatched house (from the Aztec *xacalli*), the walls of which are constructed of bamboo sticks tied together with *Ficus angelica*; while the roof is made of the leaves of the fan-palm neatly plaited, and is absolutely water-tight. In the larger villages there are also houses built of white bricks.

The principal articles of food are black beans, coffee, and cakes of ground corn without salt,—the so-called *tortillas*, which are always eaten hot and fresh. There are no inns, and the traveller has to rely on hospitality.